IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
LUFKIN DIVISION

SEOUL SEMICONDUCTOR COMPANY, LTD.,	§	
	§	
Plaintiff,	§	Case No. 9:07-cv-273 (RHC)
	§	
v.	§	
	§	JURY TRIAL DEMANDED
NICHIA CORPORATION, NICHIA AMERICA CORPORATION, and DAKTRONICS, INC.,	§	
	§	
Defendants.	§	

SEOUL SEMICONDUCTOR CO.'S
OPENING CLAIM CONSTRUCTION BRIEF

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I. INTRODUCTION

It is an established tenet of patent law that claims define the invention and limitations from the specification should not be imported into the claims. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc). Defendants Nichia Corp., Nichia America Corp., and Daktronics, Inc. (collectively, "Nichia") have repeatedly violated this principle by seeking constructions that import limitations from illustrative embodiments of the specification into the claims. Such constructions are inconsistent with the claims' plain language and do not reflect the careful balance of using embodiments disclosed in the specification to enable one skilled in the art to practice the invention without confining the claims to those embodiments. *See id.* at 1323. Specifically, Nichia's proposed constructions of "semiconductor material," "active layer," "sub-layer" and "inclusion" are transparent attempts to severely restrict the scope of the claims by hanging on to a few sentences in the specification. Such constructions, which do not reflect the ordinary and customary meaning of the claim terms, must be rejected.

Seoul Semiconductor Company, Ltd.'s ("SSC's") constructions, on the other hand, do not import extraneous limitations and are consistent with the claims' plain language as well as being supported by the specification. SSC's constructions reflect the balance of interpreting claims in light of the specification, while avoiding importing limitations from the specification.

II. BACKGROUND

U.S. Patent No. 5,075,742 (the "'742 patent"), entitled "Semiconductor Structure for Optoelectronic Components with Inclusions," is directed to a novel use of "inclusions" to improve the operation of certain types of semiconductor devices.

An application of the '742 patent relates to light emitting diodes, or "LEDs." LEDs are semiconductor devices that convert electric current into light and are commonly found in traffic signal lights and consumer electronics such as cellular phones and portable computers for display lighting. Generally speaking, an LED consists of layers of different semiconductor material that are grown on a base material, or a "substrate." A common design for LEDs includes an active layer of semiconductor material formed between two oppositely doped layers, one being "p-type" and the other being "n-type." The "p-type" layer has positive charge carriers, called holes, and the "n-type" layer has negative charge carriers, called electrons. During operation, a current is applied across electrical contacts to the doped layers, which causes negatively charged electrons and positively charged holes to move from the doped layers into the active layer. The electrons and holes meet (or "recombine") and generate light. The light is emitted in all directions from the active layer and escapes from the surfaces of the LED.

During the manufacturing process of LEDs, when a layer of one type of semiconductor material is grown on a base or substrate of a different material, cracks or so-called "dislocations" can result. For example, when gallium arsenide (GaAs) layers are grown on a silicon (Si) substrate, or gallium nitride (GaN) layers are grown on a sapphire substrate, the atoms in the grown crystalline semiconductor layers do not exactly line up with those in the substrate so numerous cracks or dislocations can form in the

layers. These cracks or dislocations can be so numerous that they can prevent light from being generated altogether (or at least interfere with device performance).

These dislocations affect light output by trapping electrons and holes in sites that do not emit light. Such dislocations are undesired in semiconductor light emitting devices. Distinguished inventors of the '742 patent, Claude Weisbuch[1] and Jean-Michel Gerard[2], however, conceived of a novel device design where the problem of such dislocations could be by-passed by adding "inclusions" during the growth of the critical active layer of an LED or laser diode. The inclusions serve a unique purpose for improving the optical properties of semiconductor devices that suffer from the dislocation problem mentioned above, *i.e.*, where the device layers are formed on a substrate of different material. The "inclusions" are formed from semiconductor material having a lower "forbidden band gap"[3] than the surrounding material such that electrons and holes are attracted to and move to the inclusions, are trapped there, and recombine to lead to the

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1 Dr. Weisbuch is a Distinguished Professor, Materials Department, University of California at Santa Barbara. *See* Rosenthal Decl. Exh. 1. Dr. Weisbuch, a Fellow of the American Physical Society, has received numerous prizes for his work, including the Welker Prize, awarded by the International Conference on Compound Semiconductors, for fundamental contributions to the development of novel optoelectronic device concepts. In addition, Dr. Weisbuch has authored over 180 technical publications and has given over 50 invited talks at international conferences over the past 30 years throughout the world.

2 Dr. Gerard is the Head of the Physics of Materials and Microstructure Laboratory of Commissariat à l'Énergie Atomique (CEA) in Grenoble, France. Dr. Gerard is also a Physics Professor at the Ecole Polytechnique (part time). *See* Rosenthal Decl. Exh. 2. Dr. Gerard has over 200 publications which have been extensively cited.

3 The parties have agreed that the claim term "forbidden band gap" (also called "bandgap") means "the energy difference between the conduction band and the valence band of a material."

emission of light. Importantly, the inclusions trap electrons and holes away from dislocations, limiting their negative effects.

III. CLAIM CONSTRUCTION LEGAL STANDARDS

Words of a claim "are generally given their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). In some cases, "the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Phillips*, 415 F.3d at 1314.

In most cases, ascertaining the ordinary and customary meaning of the claims requires the court to consider "those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean." *Phillips*, 415 F.3d at 1314 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)). Such sources include the intrinsic record, *viz.*, the claims, the specification, and prosecution history. *Id.* As stated in *Phillips*, "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." 415 F.3d at 1313.

Although the specification is highly relevant in determining the meaning of a claim term, courts must be careful to avoid "the danger of reading limitations from the specification into the claim." *Phillips*, 415 F.3d at 1323. In *Phillips*, the Federal Circuit acknowledged that the distinction between reading claims in light of the specification and importing limitations from the specification into the claim can be difficult and stated that

"although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments." 415 F.3d at 1323. To avoid importing limitations from the specification into the claims, the Federal Circuit noted that it is important to remember that the purpose of the specification is to teach and enable those skilled in the art to make and use the invention and to provide a best mode for doing so, not to necessarily restrict the invention to specific examples provided in the specification. *Id.* According to the Federal Circuit, the "manner in which the patentee uses a term within the specification and claims usually will make the distinction apparent." *Id.*

Finally, although intrinsic evidence is most informative in determining the claims' customary and ordinary meaning, a court may use extrinsic evidence, which "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317 (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995) (en banc)).

IV. SSC'S PROPOSED CONSTRUCTIONS

In the following sections, SSC explains, on a term-by-term basis, which of the disputed claim terms genuinely need construction and set forth why SSC's proposed constructions should be adopted.

A. "Semiconductor/Semiconductor Material"

Claim Language	SSC's Proposed Construction	Nichia's Proposed Construction
semiconductor/ semiconductor material	a material whose conductivity properties can be controlled by either adding dopants or by applying an electric field	a compound made up of two or more of the following elements: gallium (Ga), arsenic (As), aluminum (Al), indium (In), and phosphorus (P)

The central dispute between the parties' constructions is whether the term "semiconductor material" refers to a general class of materials characterized by their conductivity properties (SSC's proposed construction) or whether it refers to a particular compound made up of particular elements, to the exclusion of other well-known semiconductor elements/compounds (Nichia's proposed construction). To resolve this dispute, the Court need look no further than the patent itself.

The second paragraph of the patent states that "*Silicon Si* and gallium arsenide GaAs are currently the most widely used semiconductor materials." '742 patent, 1:14-15 (emphasis added). Thus, the specification expressly refers to "silicon" as a "semiconductor material," an element excluded from Nichia's proposed construction. To exclude silicon from the construction of "semiconductor material" would therefore be inconsistent with the specification.

Furthermore, the very next line in the specification also demonstrates that it is improper to limit the construction of "semiconductor material" to a compound composed of a set of five specific elements. The specification states that "optoelectronics has developed from heterostructure lasers with semiconductor materials *from Groups III and V* of the Mendeleevian classification[4]. . . ." *Id*. at 1:17-20 (emphasis added). Groups III and V of the Periodic Table contain many more elements than the subset of five enumerated by Nichia. For example, Group V of the Periodic Table includes the element Nitrogen (N) which is commonly used in semiconductors such as gallium nitride (GaN)

[4] The "Mendeleevian classification" is more commonly known as the "Periodic Table."

and indium gallium nitride (InGaN).[5] The specification makes nine express references to semiconductor materials from Groups "III-V" of the Periodic Table, s*ee id.* at 1:19, 1:25, 1:31, 1:35, 1:62, 2:13, 2:22, 3:13, 6:2, and therefore limiting the construction of "semiconductor material" to a subset of only five specific elements within the Group III-V family of compounds would be inconsistent with the specification of the '742 patent.

The claim language also demonstrates that the term "semiconductor material" is not limited to a semiconductor compound composed of an extremely narrow group of elements. The term is used in the claim as simply "semiconductor material," which does not expressly or implicitly recite that it is limited to five specific elements.

SSC's construction is consistent with the understanding of "semiconductor material" to those skilled in the art. As the Harper Collins Dictionary of Electronics explains, a semiconductor material is:

> a material whose conductivity can be controlled by the presence of impurities. The conductivity of a doped semiconductor may be one or more orders of magnitude lower than that of a conductor. Semiconductors can be elements, such as selenium, germanium, or silicon, or compounds such as gallium arsenide, antimony trisulfide, or cadmium sulfide.

See Rosenthal Decl. Exh. 3, "semiconductor;" *see also* Rosenthal Decl. Exh. 4 [Electronics and Nucleonics Dictionary (1966)], "semiconductor" ("a material whose resistivity is between that of insulators and conductors. The resistivity is often changed by light, heat, an electric field, or a magnetic field."). SSC's construction comports with these definitions, which help show what one of ordinary skill in the art understood the term to mean.

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5 In fact, Nichia's accused products use these very semiconductors.

B. “Inclusion”

Claim Language	SSC’s Proposed Construction	Nichia’s Proposed Construction
inclusion/ three-dimensional inclusions	An “inclusion” means “a crystal or a fragment of a crystal found within another crystal.” Given this construction of “inclusion,” the phrase “three-dimensional inclusions” does not require further construction by the Court.	Nichia proposes to construe “three-dimensional inclusion” as “islands of indium arsenide grown using three-dimensional nucleation and then buried by a different material.”

SSC contends that the term “inclusion” should be construed according to the meaning that it has in its ordinary use in the field: a crystal or fragment of a crystal found within another crystal. Nichia, in contrast, contends that the term should be construed to include three limitations: (1) shaped like islands, (2) grown only by a three-dimensional nucleation process and (3) made of a particular semiconductor material—indium arsenide. The intrinsic record does not require these limitations, and importing them from the specification into the claims is thus improper.

The specification supports SSC’s construction. First, the inclusions clearly comprise semiconductor material surrounded by other semiconductor material. *See* ’742 patent, claim 1 (inclusions are made of “semiconductor material”); 5:37-37 (in a preferred embodiment, the InAs inclusions are “buried inside the active layer 4a”). Second, inclusions comprise different material than their surroundings. This is because “[t]he main object of this invention is to reduce the influence of dislocations,” *id.* at 2:59-60, and thus inclusions clearly “ensure a function of traps for the carriers, thereby avoiding diffusion of the latter towards the core of the dislocations and the associated nonradiative centers.” *Id.* at 3:5-8. To accomplish this function, inclusions must differ

from the material that surrounds them; in particular, they must have a lower forbidden band gap. *See id.* at 4:55-66. Third, inclusions—like their surroundings—are crystalline in nature, as they are formed "during the semiconductor crystal growth." *See* Rosenthal Decl. Exh. 5 [Response to Second Office Action at 5]; *see also* '742 patent, 5:37-38 ("Constrained within the GaAs lattice, the inclusions do not however contain any dislocation").

SSC's construction, as supported by the specification, is consistent with the plain meaning of the term and follows from its consistent use in a number of contexts, including crystallography and metallurgy. In general, an inclusion is some material that is encased in a larger host and differs in composition from its surroundings. *See, e.g.*, Rosenthal Decl. Exh. 6 [Dictionary of Mechanical Engineering] (defining an inclusion as "[a] feature in a material . . . not identical to the material matrix"); Rosenthal Decl. Exh. 7 [McGraw-Hill Dictionary of Scientific and Technical Terms] (in the metallurgical context, an inclusion is "[a]n impure particle . . . trapped in molten metal during solidification"). Thus, SSC's construction of an inclusion as a crystal or part thereof contained within another crystal comports with the ordinary meaning. *See Mangosoft, Inc. v. Oracle Corp.*, 525 F.3d 1327, 1333 (Fed. Cir. 2008) (finding "nothing improper" about referencing a technical definition "when considered in the context of and not divorced from the intrinsic evidence").

Nichia's construction, on the other hand, seeks to add additional limitations to this plain meaning that are unsupported by the intrinsic record. Nothing in the specification or file history requires that inclusions have a particular shape, are made in any particular way, or comprise one particular material.

First, it is immediately clear that inclusions need not comprise indium arsenide. One embodiment described in the specification specifies that "the active layer 4a is modified by comparison with the previous layer 4, by punctual inclusions 8 in a semiconductor material, *such as* indium arsenide InAs . . . ." '742 patent, 4:55-58 (emphasis added). This open-ended language indicates the inventors' clear intent not to limit the composition of inclusions to indium or arsenide.

Second, the specification is clear that the growth method disclosed in a preferred embodiment is not the only one which may be used to create an inclusion:

> It is possible to apply the invention within the framework of *other growth techniques* for which a transition to a three-dimensional growth mode has been observed. The fabrication of a GaAs laser structure on Si with InAs inclusions is, *for instance*, also possible in vapor phase epitaxy from organometallic compounds.

'742 patent, 6:36-41. Claim 1 does limit the scope of the patent to devices where the inclusions are formed "during growth," but it does not specify the particular growth method.

Finally, the intrinsic record does not support Nichia's proposed limitation on the shape of the inclusions that are to be inserted into the device. First, the text of the claim clearly indicates only that the inclusions are "three-dimensional," without further restrictions on their shape. If the inventors intended to limit the shape of inclusions to an "island" shape, they surely could have elected to do so, as the term does appear when discussing one embodiment of the invention in the specification. *See, e.g., id.* at 5:24 ("Islands 8 of indium arsenide InAs form at the surface."). However, it is improper here to import a limitation from the specification when the claim does not indicate any such

limitation should be so imported. In fact, nothing in the patent indicates that the inventors intended to limit the scope of the invention to its preferred embodiments, and Nichia's proposed construction therefore is an impermissible attempt to limit the claims.

C. "Active Layer"

Claim Language	SSC's Proposed Construction	Nichia's Proposed Construction
active layer	a layer in the device that is capable of emitting light (*i.e.*, emitting photons as electrons and holes recombine) when current is applied	the layer in which both types of carriers (electrons and holes) are simultaneously present

SSC's proposed construction of "active layer" describes its functionality, *i.e.*, a layer in a device that is capable of emitting light when current flows, whereas Nichia's proposed construction focuses on a characteristic of an active layer (as well as other layers) which is not helpful and does not further clarify the meaning of that term to those having ordinary skill in the art.

SSC's construction of the term "active layer" comports with the ordinary and customary meaning of the term and is supported by the intrinsic and extrinsic evidence. An "active layer" is well known in the semiconductor light emitting device field as the layer that is capable of emitting light when a current is applied. *See* Rosenthal Decl. Exh. 7, "*active region*" (The region in which amplifying, rectifying, *light emitting*, or other dynamic action occurs in a semiconductor *device*) (emphases added).

In fact, SSC's construction is informed from this Court's construction of the very same term in *BridgeLux, Inc. v. Cree, Inc.*, No. 06-240 (RC). In that case, which also involved important semiconductor light emitting device technology with similar claim construction issues, this Court construed "active layer" as "a region in a light emitting

diode that is capable of emitting light (i.e. emitting photons as electron and holes recombine) when current is applied." *See* Rosenthal Decl. Exh. 8 [Memorandum Opinion and Order, dated June 3, 2008].

That same construction is proper in this case. The specification makes clear that the "active layer" is the layer in the device where light can be emitted when a current is applied. For example, the specification discloses: "In the layer 4 which constitutes the active region of the laser, energy is transferred to the electromagnetic wave by the *recombination of the carriers*." '742 patent, 4:30-32 (emphasis added). SSC's construction, as supported by this Court's construction in the *BridgeLux* case, properly defines the term "active layer."

While the "active layer" may be a layer where electrons and holes are simultaneously present, such a characteristic does not define an "active layer" and does not point out the functionality of the "active layer," which is to emit light when current is applied. Nichia attempts to use two statements in the specification to support its definition of the term "active layer." Those statements, however, do not define the term or show that Nichia's construction is proper. The first statement that Nichia relies on for support comes in a discussion of "lasers" (and not LEDs): "there is a reduction in the size of the active layer which is the only region of the structure in which the two types of carriers are simultaneously present." *Id.* at 2:47-50. However, that statement merely confirms that in *lasers* the active layer is the only region where the two types of carriers are simultaneously present. In optical devices other than laser devices, an active layer is *not* necessarily the only region in which the two types of carriers are simultaneously present. *See* Rosenthal Decl. Exh. 9 [E. Fred Schubert, Light-Emitting Diodes, 81 (2nd

Ed 2006) (2003)] (stating in a section entitled "Electron-blocking layers" that "[c]arriers tend to escape from the active layer of an LED into the confinement layers."). Thus, Nichia's construction of the term "active layer" as being the only area where electrons and holes are simultaneously present is technically flawed.

Nichia's proposed construction improperly focuses on whether the two carriers are simultaneously present in the active layer. SSC's construction properly focuses on the functionality of the active layer and tracks the ordinary and customary meaning of the term, which is the layer in a device that is capable of emitting light when current is applied.

D. "Layer"

Claim Language	SSC's Proposed Construction	Nichia's Proposed Construction
layer	a layer of material but does not refer to a substrate in a device	This term does not require construction. If the Court wishes to construe the term, Nichia proposes: a thickness of material. "Layer" does not exclude substrates (substrate layers) and is not defined in terms of "devices"

The central dispute regarding the construction of the term "layer" is whether it includes a substrate in a semiconductor device. SSC's construction reflects the fact that the "substrate" is different from a "layer" in a semiconductor device and is the part of the device upon which the layers are grown or formed.

The specification makes clear that the term "layer" has a different meaning from a "substrate." In the "State of the Prior Art" section, there is a discussion of "substrates" and that term is consistently used. *See* '742 patent, 1:14-47. Nowhere does that section

refer to a "layer" when discussing a "substrate." Moreover, in the "Description of the Preferred Embodiments," the specification contrasts the term "layer" with "substrate." In particular, the specification discloses that the "known structure comprises a semiconductor *substrate* 1 and a stacking of three or four *layers* in semiconductor material 2, 3, 4 and 5 placed on a major side of the substrate 1." *Id*. at 3:59-62 (emphases added). Such a description clearly shows that the term "substrate" has a different meaning from the term "layer" in the specification. This distinction is repeated throughout the specification. *See id.* at 4:11-13 ("the stacking of *layers* 2 to 5 constitutes a double heterostructure GaAs/GaAlAs formed on a *substrate* in silicon Si") (emphases added); 4:14-16 ("The *layer* 2 is of the monolayer or multilayer type and is epitaxially deposited directly on said major side of the *substrate* 1 and is in GaAs") (emphases added); 4:46-48 ("the semiconductor laser structure embodying the invention comprises a *substrate* 1a, and superposed *layers* 2a, 3a, 4a") (emphases added); Figs. 1 and 4 (numerical element 1 refers to a substrate and elements 2-7 refer to layers). In fact the term "substrate" is mentioned seventeen times throughout the specification and is never used to refer to a layer.

One having ordinary skill in the art would understand that the two terms are different because the terms have distinct well-known meanings. Layers are generally thin coatings that are deposited or formed on an underlying base. In contrast, a substrate is what the layers are grown upon. The specification discusses growing layers upon a substrate. Therefore, it makes no sense to call the "substrate" a "layer." Accordingly, one having skill in the art would read the specification and its repeated references to "substrate" and "layer" and would understand that those terms have different meanings.

Indeed, Nichia's own patents draw the same distinction between "substrates" and "layers." *See* Rosenthal Decl. Exh. 10 [U.S. Pat. Nos. 5,578,839 (Fig. 1, 2:4-5)]; Rosenthal Decl. Exh. 11 [5,767,581[6] (abstract, 1:18-22)].

E. "Sub-Layer"

Claim Language	**SSC's Proposed Construction**	**Nichia's Proposed Construction**
sub-layer	a portion of a layer	a distinguishable portion of a layer constituted of the same material as the layer

Both parties agree that the construction of the term "sub-layer" is a "portion of a layer." Nichia proposes that the construction of the term should include two additional limitations: (1) that the portion is somehow "distinguishable" and (2) that the portion is of "the same material as the layer." Both of these extraneous limitations should be rejected.

The first limitation is inconsistent with the second. Nichia proposes that the portion be "distinguishable" yet is also proposing that the portion be "of the same" material as the layer. Nichia's use of the terms "distinguishable" and "same" in its proposed construction renders the construction internally inconsistent and ambiguous. Such a construction would be utterly confusing to a jury.

In addition, Nichia's proposed second limitation that the sub-layer is "constituted of the same material as the layer" is inconsistent with the claim language. Claim 1 requires that the inclusions be part of the sub-layer: "each of said sub-layers having three-dimensional inclusions . . . ." The specification clearly teaches inclusions of a material different from the surrounding material. *See* '742 patent, 5:7-38 (in a preferred

6 SSC has requested that Nichia produce certain information from a prior litigation where these particular terms were litigated.

embodiment, the InAs inclusions are "buried inside the active layer 4a" made of GaAs). Thus, the patent demonstrates that the sub-layer does not have to be the same material as the layer.

SSC's proposed construction of "sub-layer" as "a portion of a layer" is the ordinary and customary meaning of the term. The term "sub" implies a smaller portion of the larger portion. That construction is consistent with the intrinsic record and should be adopted.

F. "[Inclusions] in a semiconductor material"

Claim Language	SSC's Proposed Construction	Nichia's Proposed Construction
[inclusions] in a semiconductor material	[inclusions] made of a semiconductor material	The phrase is indefinite because it is fatally ambiguous as to whether "in" means "inside" or "made of." The specification is consistent with both constructions.

The parties have already agreed that the word "in" in the phrase "[plural layers] in semiconductor material" in claim 1 means "[plural layers] *made of* semiconductor material." Exh. A to Joint Claim Construction Statement [Doc. No. 44]. SSC asserts that the same word has the same meaning elsewhere in the claim and, in particular, in the phrase "[inclusions] in a semiconductor material." Nichia tries to argue that the word is indefinite.

The intrinsic record makes clear that the term "in" in the phrase "[inclusions] in a semiconductor material" means "made of." Claim 1 uses the phrase "in [a] semiconductor material" two times. The phrase "in semiconductor material" is first used in the first line of the claim, and Nichia has already agreed that this phrase means "made of." Claim 1 uses the term "in" a second time in the phrase "in a semiconductor

material." Identical terms in different portions of the claim are presumed to have the same meaning unless the specification and prosecution history make clear that the terms have different meanings at different portions of the claim. *See PODS Inc. v. Porta Star, Inc.*, 484 F.3d 1359, 1366 (Fed. Cir. 2007); *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1328 (Fed. Cir. 2006).

That presumption has not been rebutted here because not only do the specification and the prosecution history not show that the terms have different meanings in different portions of the claim, these internal sources demonstrate that the term "in" in the phrase "inclusions in a semiconductor material" clearly means "made of." Indeed, ample support exists in the specification for construing "[inclusions] in" as "made of," which even Nichia acknowledges. *See* Joint Claim Construction Chart, "[inclusions] in." For example, the specification discloses: "According to the invention, the active layer 4a is modified by comparison with the previous layer 4, by punctual inclusions 8 *in* a semiconductor material, *such as* indium arsenide InAs . . . ." '742 patent, 4:55-58 (emphases added). After the phrase "inclusions 8 in a semiconductor material," the specification discloses the types of materials of the inclusions, demonstrating that the term "in" in this context means "made of" and not "inside."

Furthermore, the claims in the original French application, which the '742 patent claims priority from, provide additional support that the term "in" in the phrase "inclusions in a semiconductor material" means "made of." Claim 1 in that application, as translated, states "inclusions made of a semiconductor material." *See* Rosenthal Decl. Exh. 12 [Certified Translation of French Ap. No. 90 00229]. Thus, the patentee clearly

intended that the term "in" in the phrase "[inclusions] in a semiconductor material" mean "made of."

In sum, the intrinsic record makes clear that the term "in" in the phrases "[inclusions] in a semiconductor material" and "[plural layers] in semiconductor material" have the same meaning: "made of".

G. "Structure having plural layers in semiconductor material"

Claim Language	SSC's Proposed Construction	Nichia's Proposed Construction
structure having plural layers in semiconductor material	two or more layers of semiconductor material used in a semiconductor device	This term does not require construction in light of the parties' agreement on the construction of "plural" and "[plural layers] in semiconductor material" "Structure" is not synonymous with "semiconductor device."

Based on discovery to date, it is clear that Nichia is attempting to interpret the phrase "structure having plural layers in semiconductor material" extremely broad so as to include any sort of material or system with plural layers, whether or not the structure is used in a device. Such a broad construction should be rejected.[7]

The specification and file history consistently demonstrate that the invention disclosed and claimed in the patent is directed to a semiconductor device. Nothing in the intrinsic record suggests otherwise. Indeed, the specification characterizes the invention in terms of a device. For example, the first line of the "Abstract" states that the "object of the invention is to reduce the influence of dislocations *on the functioning* of structures *for*

[7] We note that the parties do not dispute that the claim phrase "plural" means "two or more" and that the word "in" contained in the phrase "[plural layers] in semiconductor material" means "made of."

optoelectronic component, *such as laser*, made from semiconductor materials." '742 patent, Abstract (emphases added). Moreover, the first line of the "Object of the Invention" states that the "main object of this invention is to reduce to influence of dislocations *on the operating of structures for optoelectronics components, such as lasers*, fabricated from semiconductor materials." *Id.* at 2:57-62 (emphasis added). When describing the invention in its broadest context, the specification always references the invention's use in a semiconductor device. Indeed, there is no suggestion that the invention has any application outside of such a use.

The prosecution history also demonstrates that the invention is properly characterized in terms of a device. In the first Office Action, the Examiner described claims 1 through 6 in the original application as "drawn to a *semiconductor device*." Rosenthal Decl. Exh. 5 [Office Action, March 11, 1991, at 2] (emphasis added). The prosecuting attorney repeated the Examiner's characterization. *See Id.* [Response to First Office Action, July 23, 1991, at 4] ("The applicants herewith elect to continue prosecution on the claims of Group I, *namely claims 1-6 drawn to the semiconductor device.*") (emphasis added).

Furthermore, the Examiner clearly considered the invention to be directed to a device as indicated by the classification that the Examiner assigned to the invention. The Examiner must place the invention in the appropriate classes and subclasses of the U.S. Patent Classification System, and those characterizations are listed on the front of the patent. The Examiner assigned the invention only to device classes: Class 357, entitled "Active Solid State Devices, e.g., Transistors, Solid State Diodes," and Class 372, entitled "Coherent Light Generators." *See* '742 patent, Cover Page at [52]; Rosenthal

Decl. Exh. 13 [Manual of Classification]. Notably, the Examiner did not assign the invention to any classes directed to materials (such as Class 252 entitled “Compositions”) or structures used for testing semiconductor materials (such as Class 356 entitled “Optics, Measuring, and Testing”). Rosenthal Decl. Exh. 13 [Manual of Classification].

In fact, device classes 357 and 372 were the only classes the Examiner searched in to find prior art. *See* ’742 patent, Cover Page at [58]. Moreover, the only patents the Examiner cited and considered relevant were from these device classes. *See id.* Cover Page at [56]. Thus, the Examiner clearly characterized the invention in terms of a device and did not consider the invention to be anything other than a device, such as a “composition” or structures used for testing semiconductor materials.

Nichia incorrectly suggests that SSC’s construction equates a “structure” with a “semiconductor device.” It does not. Rather, SSC’s construction makes clear that the patent claims only those semiconductor structures that are used in semiconductor devices. This construction comports with Nichia’s own use of the term in its semiconductor device patents. *See, e.g.*, U.S. Pat. Nos. 5,563,422, claim 1 (claiming a “compound semiconductor device” comprising “a semiconductor stacked structure”); 5,877,558, claim 3 (claiming a “compound semiconductor light-emitting device” comprising “a semiconductor stacked layer structure”); 5,959,307, (claiming “a nitride semiconductor device having a nitride semiconductor layer structure”). Rosenthal Decl. Exhs. 14 – 16.

H. "Sub-layers deposited successively during growth of said one layer, each of said sub-layers having . . . inclusions"

Claim Language	SSC's Proposed Construction	Nichia's Proposed Construction
Sub-layers deposited successively during growth of said one layer, each of said sub-layers having . . . inclusions	sub-layers including inclusions are formed by successive depositions of material during growth of the layer	It is not necessary to construe this phrase. If the Court wishes to construe the phrase, Nichia proposes "the layer is grown by depositing sub-layers, one immediately following the other, interrupted only by a plane of inclusions, and every sub-layer has inclusions setting it off from the other sub-layers"

SSC proposes that the phrase "sub-layers deposited successively during growth of said one layer, each of said sub-layers having . . . inclusions" expresses a single concept—namely, that all sub-layers (including inclusions) are formed during growth, as opposed to forming inclusions after the sub-layers have been grown. To that end, SSC construes this phrase to mean that the "sub-layers including inclusions are formed by successive depositions of material during growth of the layer." Nichia's alternative construction simply ignores the reason the phrase was added to the claim. Instead, it incorrectly suggests that sub-layers can be "deposited successively" regardless of how the inclusions are formed.

The prosecution history makes clear that the invention is directed to the use of inclusions formed *during* the growth of the sub-layers, as opposed to *after* the growth of the other layers. The phrase "sub-layers deposited successively during growth of said one layer" was added as part of an amendment to Claim 1 and expresses the concept that inclusions are created during the growth process. This limitation was added to distinguish the claim over references cited by the Examiner that disclose forming so-

called “quantum boxes” after the growth of the semiconductor layers. *See* Rosenthal Decl. Exh. 5 [2d Office action at 3]. For example, one of these references, U.S. Pat. No. 4,802,181 to Iwata, describes “quantum well boxes formed by an injection of ions,” a process which occurs *after* the growth of the active layer. Rosenthal Decl. Exh. 5 [Response to 2d Office Action at 5]; Rosenthal Decl. Exh. 17 [Iwata Patent]. Indeed, the response to the Examiner’s Office Action expressly states that, according to the invention, the deposition of inclusions “is realized *during* the semiconductor crystal growth.” *See* Rosenthal Decl. Exh. 5 [Response to 2d Office Action at 5]. The amendment therefore clarified that the patent discloses the use of inclusions that are formed by successive deposition of material, excluding other non-growth steps disclosed in the references cited by the Examiner. *See id.* at 4-5 (observing that the Cibert et al. and Iwata references include non-growth steps, such as providing a “mask,” “annealing,” and “injecting ions”); *see also Phillips*, 415 F.3d at 1317 (“the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention”).

Consistent with the prosecution history, the specification describes the formation of an active layer 4a by depositions of GaAs and InAs with no post-growth steps. *See* ’742 patent, 5:9-17 (describing the deposition of a thin layer of InAs after a deposition of GaAs); 5:33-35 (“After each *deposition of inclusions* in a plane, the *epitaxial growth of GaAs is again performed* so as to form another active sub-layer”) (emphases added).

In contrast, Nichia’s proposed construction is confusing, particularly in that it appears to distinguish between the deposition of inclusions and the deposition of other portions of the layer having inclusions. This ignores the clear purpose of the amended

claim language: to clarify that the inclusions are inserted using a growth process during growth. Nichia's attempt to include this concept elsewhere—to wit, its proposed construction of "three-dimensional inclusion"—is improper.

V. CLAIM TERMS THAT DO NOT REQUIRE CONSTRUCTION

Although submitted to the Court as a disputed term, the parties now agree that "having" does not require construction. In addition, SSC asserts that the following terms do not require construction because the meaning of these terms is sufficiently clear from the claim language itself and Nichia's proposed constructions do not add precision: "forbidden band gap of said one layer," "each of said sublayers having . . . a narrower forbidden band gap than a forbidden band gap of said one layer," and "deposited successively." In light of the parties' agreement as to the meaning of "forbidden band gap," no further construction of these claim terms is needed.

VI. CONCLUSION

For the foregoing reasons, SSC respectfully requests that the Court adopt SSC's proposed constructions, which find proper support in the intrinsic record, and reject Nichia's proposed constructions.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing document was filed electronically in compliance with Local Rule CV-5 on this 8th day of August, 2008. As of this date, all counsel of record have consented to electronic service and are being served with a copy of this document through the Court's CM/ECF system under Local Rule CV-5(a)(3)(A).

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